

DuPage County, Illinois
Energy Efficiency & Conservation Block Grant
Executive Summary & Final Report
Report 2013



Making DuPage a great place to live, work and raise a family.

Winner of the 2011 Illinois Governor's Sustainability Award

DuPage County Board Chairman Daniel J. Cronin

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**ENERGY EFFICIENCY & CONSERVATION BLOCK GRANT (EECBG)
EXECUTIVE SUMMARY**

DuPage County selected a multi-disciplined approach to reduce energy consumption and waste generation. Projects were selected that would have leadership elements and provide community-wide benefits.

The County selected projects based on the following information.

- The U.S. EPA has determined that buildings utilize more than 40% of the energy used in the U.S, therefore the majority of projects focused on improving campus energy efficiency.
- DuPage County is urban and is subject to traffic congestion. The traffic signal and mapping projects were selected to reduce drivers’ on-road commute time, daily transportation costs, and dependency on oil/gasoline with the added benefit of reducing greenhouse gas emissions.
- Creating new products from raw materials utilizes more energy than recycled resources. A commercial recycling initiative and a materials reduction project were implemented. The projects resulted in decreased operating costs for the County and business’ participating in the programs.

EECBG PROGRAM YEAR CAMPUS ELECTRICITY CONSUMPTION*

Year	kWh Usage	Energy Savings from baseline year	Energy Savings year to year
2009 (baseline)	48,231,525 kWh	n/a	n/a
2010	41,678,266 kWh	6,553,259 kWh	6,553,259 kWh
2011	42,614,405 kWh	5,617,120 kWh	-936,139 kWh
2012	40,472,897 kWh	7,740,628 kWh	2,141,508 kWh
% Savings		16%	

*Usage fluctuates due to weather conditions. 2013 energy increases are expected due to the construction of two new buildings. Specific project savings are identified in the remainder of this document. The above shows the downward trend of electricity consumption after project implementation.

TRANSPORTATION PROGRAMS

Another critical potential for energy savings was in transportation improvements. DuPage County instituted three projects that would save commuters fuel, time and emissions. The projects included traffic signal optimization, traffic signal synchronization and the development of a trail mapping software for bike/pedestrian users to map out routes via the trail system.

GASOLINE REDUCTION

Highland Ave. (IL56 to 31 st St.)	134 gallons/day
63 rd St. & I-355 & Main St. DG System	57.9 gallons/day
75 th St. & I-355	125.1 gallons/day
Bloomington Rd. (Brandon to Sidney)	100.7 gallons/day
Schmale Rd. (St. Charles to Geneva)	94.4 gallons/day
63 rd St. & Cass Av. System	185.7 gallons/day
Thorndale Rd. (Park to Lively)	105.0 gallons/day
County Farm Rd. (IL 38 to Jewel)	264 gallons/day
Geneva Rd. (Winfield to Gary)	110.5 gallons/day
Gary Ave. (Geneva to Lies)	1.6 gallons/day
75 th St. & Cass Ave. (Williams to Plainfield)	93.2 gallons/day
55 th St. & IL 83 Ramps (IL 83 to County Line Rd.)	317.8 gallons/day
Winfield & I-88 System	156.0 gallons/day
Naperville Rd & Diehl Rd. System	201 gallons/day
Midwest & 35 th N (includes 31 st St. and Regent)	145 gallons/day
Trail Mapping Software	1,155 total gallons (during 2yr period)
Total Savings	764,121 gallons/year \$ 3,041,201@ 3.98/gal/year

RECYCLING/MATERIALS CONSERVATION

The County also pursued materials conservation and recycling projects which yielded the following reductions. The projects included a commercial recycling program where the County worked with entities to increase recycling and the other project was the replacement of disposable dishware with reusable dishes at the Convalescent Center and reusable mugs in the cafeterias.

Cost Savings: \$296,376 in avoided landfill tipping fees at \$53/ton

Savings from Reusable Dishware: \$13,085.50/year

Waste Diverted: 5,599 tons

FINAL REPORT

DETAILED PROGRAM SUMMARY

TRANSPORTATION FUEL SAVINGS

DuPage County is a highly urbanized county in the Chicago Metropolitan Region with 600 miles of state and county highways, 50 miles of expressways, 23 interchanges, and 870 traffic signals. Throughout the County, well over 100 closed loop traffic signal systems distributing groups of traffic through 900 miles of multi-lane arterial roadways exist.

DuPage County has over 462 miles of existing bikeways which are used for work commutes, non-work errands, and recreational enjoyment. The countywide network consists of a system of regional trails connecting communities, forest preserves, employment centers and other major bicycle destinations, combined with local municipal systems that link schools, neighborhoods and local destinations to the regional network. This network provided an opportunity to increase bicycle/pedestrian traffic reducing reliance on motor fuel.

FUEL – TRAFFIC SIGNAL OPTIMIZATION

Fuel Savings: 763,543.50 gallons/year

Fuel Cost Savings: \$3,038,903/year @ \$3.98/gal

Year Project Implemented: 2010 - 2012

The County is responsible for the coordination of 320 traffic signals and 45 signal systems within the County's arterial street network. Starting in 2010, the County began re-optimizing traffic signal system timing at 111 intersections on major arterial roadways and expressway interchanges. The investigation consisted of traffic volume counts, progressive movement capacity calculations, software integration of daily/weekly/holiday traffic responsive programming, as well as before and after time delay studies.

Additionally, the County installed duct and fiber communication lines to increase the flow of vehicular traffic through the existing traffic signals along the following 5-lane arterial roadways: County Farm Road from Jewel Road to Geneva Road, Geneva Road from Winfield Road to Gary Avenue, and Gary Avenue from Geneva Road to Army Trail Road.

As a result of this initiative, commuters are saving fuel and commute time with the added benefit of improving air quality. Industry models also have found an increase in productivity when signals are optimized.

FUEL – TRAIL MAPPING SOFTWARE

Fuel Savings: 578 gallons/year

Fuel Cost Savings: \$ 2,298/year @ \$3.98/gal

Year Project Implemented: 2010

The rising cost of fuel has resulted in more people seeking out routes to bicycle to work and other destinations. While bicycle maps are available online, the public has difficulty determining the shortest and safest route to make their bicycle or pedestrian trip. In recognition, the County utilized developed software to enable users to map a non-motorized route from point A to point B. In its first year, over 10,000 miles were mapped and assumed to have replaced vehicle miles. Additionally, the software provides a safer method of travel for pedestrians and cyclists.

In September 2012, the County reconfigured the program to operate in conjunction with the County's GIS system and servers. The program was enhanced to offer better routing, aerial views, routing to mass transit and a "click to route" option. As of October 1, 2012 the County logged a reduction of 36,041 miles formerly used by motorized transportation.

ELECTRICITY & NATURAL GAS SAVINGS

ELECTRICITY – LIGHTING RETROFIT IN PARKING GARAGES AT THE COUNTY COMPLEX

Energy Savings: 677,375 kWh/year

Electricity Cost Savings: \$50,803/year

Year Project Implemented: 2010

The County replaced existing 150 watt high pressure sodium light fixtures in two of the campus parking garages. More than 900 lamps were replaced with energy efficient 50 watt LED lighting. . The new fixtures have a 50,000 hour life and can be dimmed if deemed necessary. An additional benefit to the project is increased light diffusion and security in the garages.

The County was able to also replace the top floor light poles with energy efficient LED lighting. A total of twenty (20) poles were and forty (40) fixtures in the two parking garages.

ELECTRICITY – ENERGY STAR ROOF

Energy Savings: 1,598 kWh/year

Electricity Cost Savings: \$3,100/year

Year Project Implemented: 2010

In 2010, the County an Energy Star rated white roof in place of the existing black asphalt roof. The white roof lowers the roof temperature reducing the energy demand when cooling the building. The new membrane also has a longer life expectancy and is expected to reduce the demand on the existing HVAC system. The roof was installed in four locations: ancillary covers above two stairwells, one above a pedestrian bridge and the roofing over the auditorium.

ELECTRICITY – EXIT SIGN REPLACEMENT AT CONVALESCENT CENTER

Energy Savings: 50,573 kWh/year

Electricity Cost Savings: \$3,973/year

Year Project Implemented: 2011

DuPage County exchanged 163 existing incandescent exit signs with energy efficient LED signs throughout the Convalescent Center. The project enabled the Center to standardize the signs for consistency and safety of the staff and residents. Due to the longer life span of LEDs, the Center will also see a savings in resources used replacing bulbs.

ELECTRICITY – LIGHTING RETROFIT AT THE COUNTY 140 HIGHWAY MAINTENANCE GARAGE

Energy Savings: 85,781 kWh/year

Electricity Cost Savings: \$6,004/year

Year Project Implemented: 2011

DuPage County removed high pressure sodium lighting and metal halide fixtures at the County's Highway Maintenance Garage and installed high output fluorescent fixtures. The County replaced the 400-watt lighting fixtures with efficient 168-watt fixtures with occupancy sensor controls. This project reduced energy consumption and increased lumen output of the lamps.

ELECTRICITY – LIGHTING RETROFIT AT THE COUNTY CONVALESCENT CENTER

Energy Savings: 22,400 kWh/year

Electricity Cost Savings: \$1,700/year

Year Project Implemented: 2011

DuPage County retrofitted existing incandescent lighting fixtures in the Convalescent Center's physical therapy and recreational rooms. The new fixtures were chosen due to their life span, maintenance level and light output. The existing fixtures consumed 10,500 watts with the replacement fixtures using 2,820. A total of forty-two fixtures were replaced with energy saving alternatives.

ELECTRICITY –APPLIANCE REPLACEMENT AT THE COUNTY CONVALESCENT CENTER

Energy Savings 10% - 35% per appliance

Year Project Implemented: 2011

DuPage County replaced 81 appliances at the Convalescent Center. The existing appliances ranged from 25 to 40 years in age and are located in the existing kitchen, laundry and physical therapy areas of the building. Electricity and natural savings from the Energy Star and updated appliances yielded the following estimated reductions: 8 clothes washing machines; 35% reduction in therms; 14 freezers with a 10% reduction in electricity; and 3 commercial refrigerators with a 15% reduction in electricity. These improved technologies and automatic ignition systems on ranges and cook top generally yield a minimum 2% natural gas savings.

ELECTRICITY – OCCUPANCY SENSOR INSTALLATION AND LIGHTING CONTROL SYSTEM AT THE COUNTY ADMINISTRATION BUILDING

Energy Savings: 151,840 kWh/year

Electricity Cost Savings: \$11,388/year

Year Project Implemented: 2011

DuPage County installed occupancy sensors in the Administration building. The sensors allowed the County to turn off lighting that had previously remained on in the evenings when cleaning crews were working in the building. The new system will only illuminate areas when occupied.

ELECTRICITY – OCCUPANCY SENSOR INSTALLATION AT THE JUDICIAL OFFICE FACILITY ANNEX BUILDING

Energy Savings: 350,400 kWh

Electricity Cost Savings: \$22,776/year

Year Project Implemented: 2012

The County installed the same occupancy sensors in the Judicial Office Facility Annex building. The building is 218,000 square feet and is utilized during regular business hours and intermittently by a small staff on evenings and weekends.

ELECTRICITY – ENTRYWAY BOLLARD LIGHT RETROFIT

Energy Savings: 6,880.25 kWh/year

Electricity Cost Savings: \$412.96/year

Year Project Implemented: 2011

The County replaced twenty-nine bollard lights with LED versions. The original lights were 70 watt high pressure sodium which were replaced with 30 watt LED fixtures. This project had the benefit of reduced labor and resources as the LED's last longer and require less maintenance. (65 watt reduction factoring ballast loss. Fixtures average 10 hours per day x 365=237.25 kWh/yr. Estimated blended electrical rate of \$0.06 per kWh=\$14.24 per fixture yearly savings)

ELECTRICITY –RING ROAD STREETLIGHT REPLACEMENT

Energy Savings: 30,514 kWh/year

Electricity Cost Savings: \$ 1,830.84/year

Year Project Implemented: 2012

The County removed existing 300 watt street lighting on the campus and in the Coroner's office parking lot. Thirty-six poles and 38 fixtures were replaced with 80 watt lamps. The extended life of the luminaires and fixtures will yield long term savings in labor and materials in more frequent bulb replacement. (220 watt reduction x 10hr daily usage=2200 watts x 365=803 kWh yearly savings/fixture. Estimated blended utility rate \$0.06 =\$48.18 yearly per luminaire)

ELECTRICITY – ENERGY EFFICIENT ESCALATOR REPLACEMENT

Energy Savings: 35,310 kWh/year

Electricity Cost Savings: \$2,648.30/year

Year Project Implemented: 2010

DuPage County identified an escalator system that could replace the existing system without an entire demolition. Work was able to be completed systematically within the current footprint. Six energy efficient escalators were replaced with 10 horsepower version with a reduction of 25% of the energy. The project generated a minimal amount of waste and many parts were reused or recycled. The County reduced electricity consumption by 35,310 kWh/year with an annual cost savings of \$2,648.30.

ELECTRICITY – 180 FLEET GARAGE LIGHTING RETROFIT

Energy Savings: 34,460 kWh/year

Electricity Cost Savings: \$2,067.62 /year

Year Project Implemented: 2012

Existing metal halide fixtures at the County's 180 Fleet Garage were switched out for high output fluorescent fixtures. The County replaced the 450-watt lighting fixtures with efficient 168-watt fixtures. This project reduced energy consumption and increased lumen output of the lamps. The EECBG funding enabled the County to purchase 6 of the 47 fixtures. The County contributed the funding for the remaining 41 fixtures.

NATURAL GAS – CONVALESCENT CENTER BUILDING AUTOMATION

Energy Savings: 54,000 therms/year

Natural Gas Cost Savings: \$18,000/year

Year Project Implemented: 2012

Building operation improvements were made at the Convalescent Center to make it operate in a more efficient manner. The modifications ranged from installation of variable frequency drives on air handlers to inclusion into the County's building automation system. The latter was a campus wide upgrade that has the County to operate the system at an average of 130 degrees Fahrenheit when it formerly operated at a constant 180 degrees.

RECYCLING & MATERIALS CONSERVATION

The County has increased on-campus recycling and has assisted businesses and residents with recycling of multiple items. The County has also pursued projects that reduce the waste stream through source reduction & materials conservation.

MATERIALS CONSERVATION – REUSABLE DISHWARE

Cost Savings: \$13,103.50 /year

Materials Conserved/Waste Diverted: 7.16 tons/year

Year Project Implemented: 2010

DuPage County utilized Federal Energy Efficiency and Conservation Block Grant funding to switch from disposable dishware to reusable dishware in an effort to save the energy used in manufacturing from raw materials and landfill space. The dishes were purchased for the Convalescent Center and resulted in ongoing savings at the Center. The project eliminated the purchase and disposal of 107,675 foam plates, 54,750 foam bowls, 136,875 foam cups, 109,500 plastic spoons, forks and knives annually. The project saves the County from purchasing costs of foam dishware and the expense of disposing it. The County also distributed reusable mugs to employees to use in the cafeterias for beverage purchases. This has also reduced the number of foam cups purchased and disposed.

RECYCLING – COMMERCIAL RECYCLING PROGRAM

Cost Savings: \$296,376 in avoided landfill tipping fees at \$53/ton

Waste Diverted: 5,592 tons

Year Project Implemented: 2010 - 2012

DuPage County utilized Federal EECBG funding to launch a Commercial Recycling Program that has resulted in 115 businesses starting recycling programs and 1,505 tons have been diverted from area landfills. Waste tons diverted represent a cost savings to area waste haulers of \$79,765 in tipping fees at landfills. The County partnered with businesses, municipalities and waste haulers in starting pilot recycling programs and awareness campaigns such as:

- Commercial Recycling Pilot Program and Contest with the Village of Westmont and the Westmont Chamber of Commerce that resulted in 41 businesses starting a workplace recycling program and brought recycling incentives to several hundred Westmont businesses.

- Apartment Recycling Pilot Program with the Village of Carol Stream that launched recycling in three apartment complexes. Success from this program is being used as a model to increase recycling in all apartment complexes throughout the Village.
- Commercial Recycling Awareness Campaign with the Village of Lombard that resulted in 61 businesses starting a workplace recycling program and brought recycling incentives to several hundred Westmont businesses.
- Commercial Office Building Recycling Pilot Program that launched recycling in 11 commercial office buildings in Lombard.
- There are ongoing recycling awareness campaigns and partnerships with chambers of commerce and municipalities around the County including Village of Lisle, City of Naperville, Village of Addison, City of Elmhurst, Village of Downers Grove, Village of Glen Ellyn and the City of West Chicago.
- Food scrap composting is a new industry which is taking shape in Illinois. The recycling program provided regional assistance to encourage commercial food scrap composting. A GIS map was introduced which plotted and connected haulers with interested generators. This map has been extended to include five of the northeastern Illinois counties. To date, the County has mapped 75 businesses composting food scraps within its borders. The County continues to participate in a regional council which is working on helping this new industry expand statewide food scrap composting.

EECBG SAVINGS SUMMARY

The EECBG provided the County with \$4.6 million to complete energy efficiency projects. A total of 17 projects were completed with a savings of 764,121 gallons of motor fuel/year; 54,000 therms of natural gas, 5,599 tons of waste were recycled and 1,447,131 kWh of electricity were saved. The expenditures were calculated to have created 47.40 full time job equivalents. The projects yielded a savings equivalent to 21,390 metric tons of CO₂ or the annual electricity used to power more than 2,000 homes.